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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/612,850
Filing Date: July 03, 2003
Appellants: ROBINSON ET AL.

Neil A. DuChez
For Appellants

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 10, 2007 appealing from the Final rejection mailed December 20, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is deficient. 37 CFR 41.37(c)(1)(v) requires the summary of claimed subject matter to include: (1) a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number, and to the drawing, if any, by reference characters and (2) for each independent claim involved in the appeal and for each dependent claim argued separately, every means plus function and step plus function as permitted by 35 U.S.C. 112, sixth paragraph, must be identified and the structure, material, or acts described in the specification as corresponding to each claimed function must be set forth with reference to the specification by page and line number, and to the drawing, if any, by reference characters.

The brief is deficient because the characterization of liquid reactive polymer (b) as "liquid at room temperature" in lines 4-5 under the section is not defined in the claims. Independent claims 1 and 30 merely require a carboxyl-terminated butadiene-acrylonitrile copolymer which is liquid without specifying a particular temperature.

(6) Grounds of Rejection to be Reviewed on Appeal

The statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows: The 35 U.S.C. 103(a) rejection is over Japanese Patent No. 64- or 01-060679 in addition to Minamisawa et al. Patent No. 4,500,600.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,500,660	Minamisawa et al.	2-1985
64-60679	Murakami et al.	3-1989

(9) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims.

The text of section 112 and 103(a) of Title 35, U.S. Code not included in this action can be found in the non-Final rejection mailed January 18, 2006.

Claims 1-3, 8, 9, 11 and 30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contain subject matter not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The monoepoxide species of octadecylene oxide, styrene oxide, vinylcyclohexene oxide and glycidyl methacrylate as well as the monoepoxy silanes disclosed on page 7, lines 16-18 described as epoxy resins on page 6, line 29 to page 7, line 1 of the specification do not conform to the claimed "curable composition comprising a) at least one epoxy resin." A curable epoxy resin must contain at least two epoxy groups per molecule in order to form a resinous structure and to enable reaction with a multifunctional curing agent such as those set forth on page 15, line 25 to page 16, line 27 to yield an infusible, three-dimensional cured product.

The specification on page 5, line 29 to page 6, line 1 defines an epoxy resin as "a compound containing more than one α (alpha) or 1,2-epoxy group and which is capable of being converted to a useful thermoset or cured state by a curing agent . . . " The aforementioned monoepoxides only possess a single epoxy group incapable of being converted to a thermoset or cured state by a curing agent.

Claims 1-3, 8, 9, 11 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minamisawa et al. Patent No. 4,500,660 and Japanese Patent No. 64-60679.

Minamisawa et al. (col. 7, Example 1) shows a curable composition comprising a bisphenol A epoxy resin, the reaction product of a liquid (col. 3, lines 19-24) carboxyl-terminated butadiene-acrylonitirle copolymer (CTBN) and an epoxy resin, and a carboxyl-modified butadiene-acrylonitrile rubber (col. 4, lines 52-61).

The Japanese patent (translation, page 10, Table 2, Reference Example 5) shows a mixture of a bisphenol A epoxy resin a and the reaction product of a CTBN (page 5, lines 11-13) and an epoxy resin designated as f (page 11, lines 2-3) and a carboxyl group-containing acrylonitrile copolymer Nipol 1072 which is a copolymer of butadiene and acrylonitrile according to column 4, lines 52-61 of Minamisawa et al.

The claimed carboxyl-terminated butadiene-acrylonitrile copolymer b) in liquid form is not recited. There is no particular required form for the carboxyl-terminated butadiene-acrylonitrile copolymers of Minamisawa et al. and the Japanese patent.

It would have been obvious to employ the carboxyl-terminated butadiene-acrylonitrile copolymers of Minamisawa et al. and the Japanese patent as a liquid in order to facilitate the blending with the epoxy resin and CTBN-epoxy resin reaction product.

(10) Response to Arguments

Re 35 U.S.C. 112, first paragraph rejection

The basis in fact for the lack of enablement of the disclosed monoepoxide species as curable epoxy resins is the definition provided on page 5, line 29 to page 6, line 1 that "an epoxy resin is a compound containing more than one α (alpha) or 1,2-epoxy group and which is capable of being converted to a useful thermoset or cured state by a curing agent . . . " The Handbook of Epoxy Resins (Exhibit A) on page I-2 under "Definition of Epoxy Resin" states that "an *epoxy resin* is defined as any molecule containing more than one α-epoxy group (whether situated internally, terminally, or on cyclic structures) capable of being converted to a useful thermoset form." The Concise Encyclopedia of Chemical Technology (Exhibit B) characterizes the epoxy resins as having an epoxide ring wherein the ensuing structures all contain at least two epoxy groups per molecule. Hawley's Condensed Chemical Dictionary on page 468 defines an epoxy resin as having "glycidyl ether structures [plural]", more epoxide groups [plural]" and "reactive epoxies [plural] form a tight cross-linked polymer network." The epoxy novolak possesses multiple epoxy groups as depicted on page 759 of the Concise Encyclopedia of Chemical Technology.

The attempt to mitigate the definition of an epoxy resin in the Handbook of Epoxy Resins due to the phrase "[f]or the purposes of this book" does not sufficiently discount the requirement for the presence of more than one α-epoxy group since the book is known to one of ordinary skill in the art as the authoritative text on epoxy resins. The definition in the Handbook of Epoxy Resins considered with appellants' own definition along with the allusions to epoxy groups in the other references establishes the definition of an epoxy resin at a level of ordinary skill in the art as having more than one epoxy group per molecule, thereby excluding the species of octadecylene oxide, styrene oxide, vinylcyclohexene oxide and glycidyl methacrylate as well as the monoepoxy silanes inaccurately listed as epoxy resins in the specification.

According to MPEP § 2164.01, Test of Enablement:

> "The standard for determining whether the specification meets the enablement requirement was cast in the Supreme Court decision of *Mineral Separation v. Hyde*, 242 U.S. 261, 207 (1916) which postures the question: is the experimentation needed to practice the invention undue or unreasonable?"

MPEP § 2164.01(a), Undue Experimentation Factors, lists the following factors to be considered to ascertain whether the experimentation is "undue:"

(A) The breadth of the claims;

(B) The nature of the invention;

(C) The state of the prior art;

(D) The level of ordinary skill;

(E) The level of predictability in the art;

(F) The amount of direction provided by the inventor;

(G) The existence of working examples; and

(H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

The determination of whether undue experimentation exists for the disclosed monopoxide species deemed to be within the claimed curable epoxy resin based on factors (A) to (H) hereinabove is analyzed hereinbelow.

(A) The breadth of the claims denote an epoxy resin. One skilled in the art is not enabled to make and use the claimed curable composition if the epoxy resin includes the monoepoxide species because they are not curable (MPEP § 2164.08).

(B) & (C) According to 2164.05(a), the nature of the invention is "the subject matter to which the claimed invention pertains" and "becomes the backdrop to determine the state of the art and level of skill possessed by one skilled in the art." "The state of the prior art is what one skilled in the art would have known, at the time the application was filed, about the subject matter to which the claimed invention pertains."

One skilled in the art at the time the application was filed would have known that an epoxy resin must contain more than one epoxy group per molecule for it to be curable as established by documented sources and appellants' own definition. The monoepoxide species set forth in the specification contradicts what one skilled in the art would consider to be a curable epoxy resin.

(D) The level of ordinary skill is established by the sources for the definition of an epoxy resin, appellants' own definition and the cited prior art such as Minamisawa et al. and the Japanese patent, all of which confirm that an epoxy resin necessitates the presence of more than one epoxy group per molecule to exhibit curability which precludes the monoepoxides listed in the specification (MPEP § 2164.05(b)).

(E), (F) & (G) Predicability is based on whether or not one skilled in the can or cannot readily anticipate the effect of a change within the subject matter to which the claimed invention pertains (MPEP § 2164.03). It cannot be anticipated that the monoepoxides deemed to be representative of curable epoxy resins in the specification can participate in a cure due to the presence of only one epoxy group per molecule. The only working examples are shown in the table on page 18 of the specification wherein Examples 1-5 contain EPON 862 and 58006 which are epoxy resins with at least two epoxy groups per molecule. There are no examples containing the monepoxide species designated as epoxy resins in the specification to establish their curability since their ability to cure is unpredictable (MPEP § 2164.02).

(H) The monoepoxides embrace such structurally distinct species as saturated monoepoxides, unsaturated monoepoxides and monoepoxy silanes. It would require numerous burdensome experiments to determine whether the claimed curable composition could be formulated and utilized therewith.

Accordingly, based on the evaluation of the factors for undue experimentation set forth in MPEP § 2164.01, undue experimentation would be required to prepare and use the claimed curable composition wherein the epoxy resin includes monoepoxides, thereby not satisfying the enablement standard under 35 U.S.C. 112, first paragraph.

Re 35 U.S.C. 103(a) rejection

The claimed composition characterizes the carboxyl-terminated butadiene-acrylonitrile copolymer b) as a liquid polymer. However, there are no conditions limiting the liquid such as temperature or liquefying the CTBN as a dispersion or solvent solution. Contrary to the basis for the arguments that the claimed CTBN is liquid at ambient temperature, the claimed liquid polymer is not confined to any particular temperature.

The carboxyl-terminated butadiene-acrylonitrile copolymers of Minamisawa et al. and the Japanese patent are not required to be in any specific form. The copolymer of Minamisawa et al. has a Mooney viscosity of between 40 and 110 at 100^{o}C (col. 4, lines 52-55), thereby falling within the claimed liquid polymer without a temperature restriction. Furthermore, it is recognized in column 3, lines 19-27 that CTBN's to be reacted with an epoxy resin are preferably liquid to provide a prepreg of good quality. It would have been obvious to employ the CTBN of Minamisawa et al. as a liquid in order to facilitate blending with the other liquid components and to provide a prepreg of good quality.

The Japanese patent in Application Example 5 of Table 1 on page 9 shows the preparation of an adhesive solution by the same method as that in Application Example 1 (page 8, the last three lines) wherein the CTBN is dissolved in a solvent. The dissolved CTBN is in a liquid form within the confines of the generally claimed liquid CTBN.

Even if the rationales hereinabove are not considered, it would have been obvious to use the CTBN's of Minamisawa et al. and the Japanese patent in liquid form in order to facilitate processing with the epoxy resin and CTBN-epoxy resin reaction product. It would be easier to blend the CTBN's of Minamisawa et al. and the Japanese patent as liquids in a liquid blend of a bisphenol A epoxy resin and CTBN-epoxy resin reaction product which would avoid the use of solvents or a heating step.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Robert Sellers

Conferees:

Randy Gulakowski

Romulo Delmendo
Appeals Specialist

rs 10/5/2007